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**Dr. Mathur Hemant H**  
Professor and Head, Department  
of Orthopaedics, Medical College  
Baroda & S.S.G. Hospital,  
Vadodara, Gujarat, India

**Dr. Rathva Bhavinkumar M**  
Senior Resident Doctor,  
Department of Orthopaedics,  
Medical College & S.S.G.  
Hospital, Vadodara, Gujarat,  
India

**Dr. Solanki Jayur J**  
Senior Resident Doctor,  
Department of Orthopaedics,  
Medical College & S.S.G.  
Hospital, Vadodara, Gujarat,  
India

**Dr. Naik Aarjav B**  
Senior Resident Doctor,  
Department of Orthopaedics,  
Medical College & S.S.G.  
Hospital, Vadodara, Gujarat,  
India

**Corresponding Author:**  
**Dr. Rathva Bhavinkumar M**  
Senior Resident Doctor,  
Department of Orthopaedics,  
Medical College & S.S.G.  
Hospital, Vadodara, Gujarat,  
India

## A study of functional and radiological outcome of uncemented total hip arthroplasty in Indian patients

**Dr. Mathur Hemant H, Dr. Rathva Bhavinkumar M, Dr. Solanki Jayur J  
and Dr. Naik Aarjav B**

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### Abstract

In Indian population, avascular necrosis of femoral head and arthritis of hip joint are common debilitating diseases which require surgical intervention. Uncemented total hip arthroplasty is the treatment modality for restoring better function and activity in these patients. In last few decades, there has been an increase demand of uncemented total hip arthroplasty in Indian patients so this study was carried out. The purpose of this study was to evaluate radiological outcome, functional outcome using Harris hip score and to analyse intra operative and post operative complications. A prospective study of 50 patients with 70 uncemented total hip arthroplasty at SSG hospital, Vadodara were taken up and followed up for 2 years between February 2017 to December 2019. Average mean Harris hip score improved from 36 points to 90 points at final followup with no intraoperative complication and minimal postoperative complications. The uncemented total hip arthroplasty is safe and durable fixation method in Indian patients.

**Keywords:** Uncemented total hip arthroplasty, harris hip score, avascular necrosis of femoral head, prospective study

### Introduction

The hip joint is the most important joint of the body as it enables person to assume various postures. Advanced hip joint diseases like avascular necrosis of femoral head, osteoarthritis produce severe disability for which conservative treatment is not useful. Providing a pain free, stable joint as treatment for various pathologies of the joints is one of the biggest and most challenging hurdles that surgeons around the world have tried to cross. The most successful modality of treatment for joint pathologies has been the evolution of the joint replacement surgeries [1].

In 1961, Sir John Charnley performed the first ever Total Hip Arthroplasty in Wrighton hospital, Wigan which marked the beginning of a new era in Orthopaedics. Since then a number of modifications and advances have been achieved in this field. By pioneering safe and long lasting hip replacement, Sir John Charnley secured his place as father of modern total joint arthroplasty. The results of Charnley total hip arthroplasty are the benchmark for evaluating the performance of other arthroplasties [2].

Total hip arthroplasty (THA) is an extraordinarily successful surgical procedure that has rightly been proclaimed 'The Operation of the Century' because millions of patients with degenerative and traumatic hip joint disease have been restored to good function and an improved quality of life after this operative procedure [3]. At recent time, total hip arthroplasty is most commonly performed reconstructive operation in worldwide. In the past, uncemented total hip arthroplasty was reserved for younger patients and cemented total hip arthroplasty was usually recommended for patients over 65 years of age but in last few decades, uncemented total hip arthroplasty is commonly done in both young patients as well as elder loosening, osteolysis, femoral bone loss, short duration of implant life and higher revision rate of operation. To solve these problems, there has been increased interest in the use of cementless methods for fixation since the late 1970s. In an attempt to improve longevity and decrease cement related complications, uncemented total hip arthroplasty has gained popularity worldwide [4, 5]. The basic aim of total hip arthroplasty is to relieve intractable hip pain and provide painless mobile hip.

## Materials and Methods

A prospective study of 50 patients with 70 uncemented total hip arthroplasty at Shri Sayajirao General Hospital, Vadodara were taken up and followed up for 2 years between February 2017 to December 2019.

### Inclusion criteria

1. Age greater than 18 years.
2. Patients operated with uncemented total hip arthroplasty.
3. Patients who have undergone Primary or Index surgery.
4. All patients who had significant disabling hip pain and moderate to severe functional limitation of activities of daily living due to various hip pathology with any of the etiology.
5. All patients who had unilateral or bilateral involvement.

### Exclusion criteria

1. Age less than 18 years.
2. All those patients who lost follow up during postoperative period.
3. Patients with severe systemic disease like renal or liver disease contraindicated surgical procedure.
4. Patients who had undergone cemented total hip arthroplasty.

### Preoperative

At the time of admission, detailed history including physical examination and local examination was taken from all the patients. Preoperative Harris hip score was calculated for every patient. An anteroposterior (AP) view of the pelvis showing the proximal femur, Pelvis with both hips (PBH), lateral view (Frog leg view) of the hip and proximal femur were taken. Preoperative routine investigations included the following: CBC, S.CRP, S.RA, S.ESR, Sickling solubility test, Coagulation profile, Renal function test including S.Urea and S.Creatinine, RBS, Blood grouping and Viral markers. Serum electrolytes, Electrocardiogram, 2D Echo, Chest Xray or any other investigations as suggested by physician were done according to preanaesthetic assessment requirements. To decrease intraoperative and postoperative complications, all patients with systemic diseases like hypertension and diabetes mellitus were treated and brought down within normal limits as per physician's advice. Preoperative traction was maintained for correction of deformity and to decrease spasm of muscles. Patients were also taught preoperative physiotherapy to ensure that patient did not face any problem, while doing the same during post operative period.

### Intraoperative

General anaesthesia and regional anaesthesia (spinal, spinal and epidural both) were used for the surgery. Preoperative medications were given 10 minutes before skin incision. This included 1000 mg Tranexamic acid, 400 mg Teicoplanin, 1500 mg Cefosulbactam. Lateral position on straight table was used for this operation. Modified Gibson approach was used in all patients [6]. Then muscle was splitted and femoral capsule identified and femoral head was removed. The acetabulum and femoral canal were then prepared by sequentially increasing size of reamer and then uncemented total hip arthroplasty was performed. After reduction of hip, posterior capsule and short external rotator muscles were reattached. A closed negative suction drain deep to the tensor fascia lata was placed.

### Postoperative protocol

Postoperatively prophylactic antibiotics in the form of Injection Cefosulbactam (1.5gm) twice a day for 5 days and Injection Teicoplanin (400mg) once a day for 3 days were given. Postoperative xrays were done on the day of surgery of the patient as soon as patient become vitally stable. Negative suction drain was removed 2 days after surgery. Sutures were removed routinely on 12th – 15th days after surgery depending on the status of the dressing and the local part. Oral Rivaroxaban 10 mg for 21days was given to all patients for prophylaxis of deep vein thrombosis. Static and active quadriceps exercises were begun on the same evening within the limits of comfort followed by high sitting on next day. On second postoperative day, active quadriceps exercises were taught followed by non weight bearing walking using walker for a period of 3 to 4 weeks. Hip abductor strengthening exercise was started on the fifth post operative day. Full weight bearing without support was started at 4-6 weeks postoperatively. Patients were followed up at postoperative period of 1 month, 3 months, 6 months, 1year, 1.5 year and final follow up at 2 years. At every time of follow up, patients were evaluated functionally by Harris hip score [7] and radiologically by xrays. Postoperative complications of these patients were also recorded.

### Results

This study consisted of 70 uncemented total hip arthroplasties in 50 patients with a minimum follow up period of 2years. Out of 50 patients, male patients were 34 and female patients were 16. 20 (40%) patients were operated for bilateral uncemented total hip arthroplasty. In our study, majority of patients were in the age group of 41-60 years (70% patients). Mean age of patients at time of surgery was 47.5 years (range 20-80 years). Avascular necrosis of femoral head (68%) and arthritis of hip joint (16%) were two major indications for uncemented total hip arthroplasty. Mean operative time was 40 minutes (range 32-50 minutes). Mean period of hospital stay was 8 days (5 days – 12 days). Average intraoperative blood loss was 300ml (range 250ml-330ml). Average blood transfusion was 1 unit per surgery. Dislocation was seen in only 1 patient after 3 months of operation. Close reduction under spinal anaesthesia was successfully done in this patient. 1 patient had developed postoperative infection after 1 month of operation. Patient was treated with surgical debridement and injectable antibiotics postoperatively according to culture and sensitivity. Two patients (4%) complained of anterior thigh pain which subsided over period of three months with conservative treatment. All patients had no significant limb length discrepancy post operatively. Functional outcome was evaluated by Harris hip score (Table 1),

**Table 1:** Functional outcome according to Harris hip score.

Sr. No.	Harris Hip Score	Number of patients	Percentage	Result
1	90-100	46	92	Excellent
2	80-89	2	4	Good
3	70-79	2	4	Fair
4	<70	0	0	Poor

Average mean Harris hip score was improved from 36 points to 90 points at final followup. The activity level was assessed at two year follow-up with maximum patients in moderate manual labour category (Table 2). Bony ingrowth with no evidence of loosening was seen both on femoral and

acetabular side in all patients on X-rays. Angle of acetabular inclination was between 35-42 degrees in 96% of patients. Femoral stem alignment was assessed radiologically (Table 2).

**Table 2:** Alignment of femoral stem

Sr. No.	Alignment	Number of cases	Percentage
1	Neutral	40	80
2	Valgus	8	16
3	Varus	2	4

**Table 3:** Various postoperative complications encountered have been shown

Complication	Number of cases	Percentage
Nerve Injury	2	4
Vascular Injury	0	-
Postoperative dislocation	1	2
Deep vein thrombosis	0	-
Intraoperative fracture	0	-
Intra operative hypotension	0	-
Post operative infection	1	2
Aseptic loosening	0	-
Anterior thigh pain	2	4



Preoperative xray



Postoperative xray

**Discussion**

Avascular necrosis of femoral head and hip arthrtitis were most common hip debilitating diseases seen in young as well as elder patients [8]. Post operative infection was only seen in 1

patient (2%). 49 patients (98%) had no postoperative infection because use of higher antibiotics, use of laminar airflow system in operation theatre and less operative time. Postoperative dislocation was seen in only 1 patient (2%) because proper selection of implants, its placement in correct version and inclination. Intraoperative hypotension was not seen in any patients due to intravenous use of tranxemic acid half an hour before surgery and control of comorbidities like hypertension, sickle cell disease within normal limits preoperatively [9]. Sciatic nerve palsy and vascular injury were not occurred due to meticulous handling of soft tissues during operation. None of the patients had developed deep vein thrombosis due to use of oral Rivaroxaban (anticoagulant), early mobilization and vigorous postoperative physiotherapy. Intraoperative femur fracture was not done in our patients because utmost care was taken during femur preparation and implantation. None of the patients showed circumferential aseptic loosening of femoral stem or acetabular component. 96% patients had excellent to good functional outcome according to Harris hip score. 2 patients had fair outcome because these patients had developed other systemic illness after operation. All patients were able to do their routine physical activities with slight modifications of lifestyle in our study. At final follow up of uncemented total hip arthroplasty, excellent functional and radiological outcome were seen in majority of these patients. According to this study, uncemented total hip arthroplasty is a procedure which provides nearly physiological joint in these patients so that patients can improve quality of life.

**Conclusion**

In various hip arthritic disorders, the uncemented total hip arthroplasty is safe and durable fixation method in Indian patients with excellent to good functional and radiological outcome, high satisfaction rate with no intraoperative complication and minimal postoperative complications by maintaining strict preoperative, intraoperative and postoperative protocol. Because the use of uncemented total hip arthroplasty continues to increase in Indian patients, further study is required to determine long term survivorship.

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